



Original Article

Empirical Analysis of Factors Affecting Integration of Pakistani Equity Markets

Ahmed Shafique Joyo (Corresponding Author)

Department of Business Administration

Shaheed Benazir Bhutto University, Nawabshah – Pakistan

<https://orcid.org/0000-0001-6949-4529>

joyomba@gmail.com

Ghazala Tunio

Institute of Science & Technology Development

Mehran University of Engineering and Technology, Jamshoro – Pakistan

<https://orcid.org/0000-0003-0838-4785>

ghazala.tunio@faculty.muet.edu.pk

Abdul Hafeez Magsi

Department of Business Administration

Shaheed Benazir Bhutto University, Nawabshah – Pakistan

hafeez.magsi@sbbusba.edu.pk

Afroz Sial

Department of Business Administration

Shaheed Benazir Bhutto University, Nawabshah – Pakistan

afroze@sbbusba.edu.pk

JEL Classification: **D53, E44, G15**

How to Cite:

Joyo, A. S., Tunio, G., Magsi, A. H., & Sial, A. (2025). Empirical Analysis of Factors Affecting Integration of Pakistani Equity Markets. *Bulletin of Multidisciplinary Studies*, 1(3), 168–181.

<https://doi.org/10.48112/bms.v1i4.955>

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Article history:

Received: November 18, 2024

Revised: December 19, 2024

Accepted: December 29, 2024

Published: January 01, 2025

Authors' Biography

Ahmed Shafique Joyo (Ph.D) is an Assistant Professor at the Department of Business Administration, Shaheed Benazir Bhutto University in Nawabshah – Pakistan. He obtained his Doctorate in Business Management from Shaheed Benazir Bhutto University in Nawabshah – Pakistan.

Ghazala Tunio (Ph.D) is an Assistant Professor at the Institute of Science & Technology Development, Mehran University of Engineering and Technology in Jamshoro – Pakistan. She obtained her Doctorate in Business Administration from the University of Sindh in Jamshoro – Pakistan.

Abdul Hafeez Magsi is a Lecturer at the Department of Business Administration, Shaheed Benazir Bhutto University in Nawabshah – Pakistan. He obtained his MBA in MBA from Shaheed Benazir Bhutto University in Nawabshah – Pakistan.

Afroz Sial (Ph.D) is an Assistant Professor at the Department of Business Administration, Shaheed Benazir Bhutto University in Nawabshah – Pakistan. She obtained her Doctorate in Business Administration from Shaheed Benazir Bhutto University in Nawabshah – Pakistan.

ABSTRACT

The purpose of this study is to analyze the factors which determine the interconnection of the Pakistani equity market with the foreign equity markets. We nominated the equity markets of the top trading countries of Pakistan which include China, Germany, Indonesia, UAE, and the USA. The study period for this analysis covers the period from 2005 to 2018, including the time of the global financial crisis (GFC) in 2008. We investigated the level of correlation between Pakistan and its trading countries by applying the DCC-GARCH model using MSCI daily stock return data. Moreover, we employed the OLS regression model and the fixed effects model to determine the effect of the determinant factors on the level of connectedness among the selected equity markets. The results showed that the interest rate differential, inflation rate differential and trade intensity, between the selected pairs of equity markets of Pakistan with foreign equity markets have a significant effect on the correlation between them. In addition, the GFC also shows a significant impact on the equity market correlation for the equity market pairs chosen. However, the results vary in different combinations of the Pakistani equity market with other equity markets, selected based on the trade relationship.

Keywords: *DCC-GARCH model, Equity market correlation, Fixed effects model, Influencing factors*

INTRODUCTION

Due to increasing trade, capital flow and technological advancement most of the equity markets have integrated. The developments in equity markets have shown a surge in the connectedness among equity markets of developed countries around the globe particularly after the global financial crisis (Tiwari et al., 2022). These changes in the connectedness level have stabilized the markets, as well as reduced the diversification gains for investors. Equity markets are barometer of an economy, which represent the economic condition of a country and the changes in the financial system (Grambovas, 2003). The equity markets are connected through the economic ties of two countries (Bracker & Koch, 1999). The international trade and investment constitute the major factors determining the interconnection of economies. The connectedness of the equity market of a country is beneficial for the economic growth of a country. It increases the flow of capital and strengthens the linkage between economies. The opportunities of investment for the long-term investors who want to diversify their investment increase with the connectedness of the equity markets. Therefore, it is important to find not only the connectedness between the equity markets having an economic relationship but also the factors that determine the connectedness in different markets.

The topic of equity market correlation of equity markets is being explored since last four decades. The literature shows that the developed

equity markets are strongly integrated, while the emerging market are weakly integrated with each other. The connectedness between the developed and emerging markets has mixed results. However, there are fewer studies which focus on the influencing factors of the connectedness of an emerging equity market with the developed equity markets. Trade and macroeconomic factors are the major influencing factors of the equity market correlation between equity markets. Pakistan as an emerging economy equity market have trading relationship with developed and emerging markets. It is necessary to examine the level of connectedness of Pakistani equity market with its trading countries and the factors that determine the connectedness between them. The aim the study is to determine the connectedness level between the Pakistan and the selected trading countries, and to determine the effect of trade intensity along with the macroeconomic variables of the selected countries on the connectedness (co-movements) between them.

In this study, we collected daily returns data from Morgan Stanley Capital International (MSCI) for sample countries for the period 2005 to 2018. Later, daily correlation results were converted to quarterly correlation and used as a dependent variable to study the influencing factors of the correlation between countries. We used quarterly data of trade and the macroeconomic variable to determine the effect of each variable on the co-movements (connectedness) between countries. The multiple GARCH model has been used to determine dynamic conditional correlation

between the pair of the equity markets price returns. The correlation can be used as a proxy of the connectedness level between two countries. Later, we used alternative panel models to determine the effect of different variables on the connectedness between the selected countries.

This study provides robust results which show that the trade intensity, inflation and the GFC have significant effect on equity market correlation. However, the policy makers should make policies towards more connectedness between Pakistan and its international partners through increased trade intensity, reduced differentials of inflation rate, interest rates. The rest of the paper is organized as follows: the second section includes the review of previous work from the empirical and theoretical perspectives. The third section consists the details of sample selection, data collection, empirical model and analysis techniques. The fourth section explains the results and discussion about the equity market correlation between Pakistan and its associated trading countries. The fifth section concludes the study along the policy recommendations.

Research Questions

- How did the global financial crisis (2007–2008) impact the correlation between Pakistan's equity market and those of its trading partners?
- What extent does trade intensity affect the connectedness between Pakistan's equity market and the equity markets of its trading partners?
- How do interest rate differentials, influence the correlation between Pakistan's equity market and those of its trading partners?
- How do inflation rate differentials, influence the correlation between Pakistan's equity market and those of its trading partners?
- What is the effect of exchange rate differentials on the correlation between Pakistan's equity market and its trading partners' equity markets?

LITERATURE REVIEW

Theoretical Framework

The connectedness of the equity markets is an interconnection of a country's equity markets with other equity markets of other country. The connected or integrated markets make trade in multiple assets simpler for domestic stock and foreign investors (Bekaert & Harvey, 2003). According to Law of one price (LOP) the prices

difference diminishes if the different markets are integrated. However, the LOP does not fully exist in case of the connectedness of the equity markets. The connectedness of equity market can take place by merger of two equity markets or through step by step economic and financial connectedness can interconnect the equity markets (Dorodnykh, 2014). Equity market connectedness has many consequences for stakeholders. It brings economies of scale and scope (Carretta & Nicolini, 2006). It increases the efficiency of market by removing the extra cost. For investors it brings the diversification opportunities with increased liquidity. However, the increased level of connectedness reduces the diversification opportunities for investors as it has been observed in developed markets. It also increases the risk of Economic shocks (Chevallier et al., 2018).

There is comprehensive literature on the connectedness of equity markets. Connectedness of the equity market has the same meaning as the words "co-movements of the equity market," synchronization of the equity market and "interrelationship of the equity market" (Joyo & Lefen, 2019). There is an abundance of studies on the equity market connectedness. Equity market connectedness has been analysed through various methodologies. Like CAPM model, correlation models, VECM models, and various derivative of MGARCH models. However, the studies on the influencing factors of these connectedness are not as much available (Mobarek et al., 2016). The question that why equity market co-movements differ among themselves can be explained in three ways. The first answer is given by contagion effect. The contagion is part of the co-movement that the economic fundamental cannot describe because the contagion is a sudden shock that can come from the global phenomenon (Pretorius, 2002).

The second category of the theories explaining the equity market correlation is explained through the linkages of the economic fundamentals. Therefore, the changes in the macroeconomic variable of the countries can explain the changes in the co-movements between these countries (Paramati et al., 2015). The last category of the economists believe that the co-movements of the markets are based in the market specific characteristic. The similar markets in terms of industrial similarity, market size, market capitalization, and volatility move together. Having determined the correlation between the equity market studies, different methodologies

were employed to assess the effect of the various variables on the equity market correlation. A group of studies used linear regression model (Aamir & Ali Shah, 2018; Aladesanmi et al., 2019; Paramati et al., 2015). Other studies have opted the fixed affect and random affect models (Büttner & Hayo, 2011; Sehgal et al., 2018). Research on influencing factors of the equity market correlation have evaluated many influencing factors among them the trade relationship is the most common influencing factors given in the studies.

Trade has been found to have a positive connection with the connectedness of the equity markets (Bracker et al., 1999; Chen & Zhang, 1997). According to some studies Bilateral trade intensity is a significant positive factor for the connectedness (Paramati et al., 2016; 2018). An opposite view is also found in the studies as Gupta and Guidi (2012) and Elyasiani et al., (1998) who identified that bilateral trade is not significant determinant of the equity market relationship. Rafiq and Hassan (2018) also indicated that there is no effect of macroeconomic variables on equity market interdependence. Aamir and Ali Shah (2018) included the size of market capitalization which is significant in enhancing equity market correlation. Wakeup call hypothesis, Goldstein (1998) suggests that crisis arising in one country put pressure on the markets of similar countries. These determinant factors transmit the

crisis signals for the co-movements among the emerging countries during crisis and non-crisis periods. Trade and financial liberalization increase co-movement of the equity market in emerging economies, especially trading countries (Beine & Candelon, 2011).

The political and policy factors also affect market connectedness for example in Europe the influence of political integration was stronger than the macroeconomic factors on the stock market connectedness. Pretorius (2002) found stronger influence of the contagion on the co-movements between the countries more than the macroeconomic variables. Dorodnykh (2014) found a new base of theory in the finance literature by including unorthodox variables as the influencing factors of equity market correlation. These variables include not only macroeconomic variables, but also variables for development, variables for regulation, structural variables, operative variables and variables for control of the equity market. Moreover, the literature has mentioned various influencing factors of global stock-market connectedness. The level of connectedness was based on the linear and non-linear dynamic correlation analysis in majority of the studies. Moreover, the studies on determinates of the equity market correlation from different countries have been summarized in the Table 1.

Table 1
 Studies on the influencing factors of the equity market correlati

Studies	Countries	Data	Model	Results
Pretorius (2002)	Ten emerging countries from Asia, Latin America, Europe and Africa.	Trade, Inflation differentials, interest rate, industrial production, size, volatility etc.	Cross sectional and time series models	Fundamentals and influencing factors explain the interrelationship of countries.
Mobarek et al., (2016)	Ten advanced and ten emerging countries were selected.	GDP Growth, Inflation Difference, Bilateral Trade, Market Size, Term Spread, Culture, Religion and dummies of Crisis period etc.	Regression model	Influencing factors support the wakeup call hypothesis
Büttner and Hayo (2011)	European union members	Interest rate, exchange rate market capitalization, and dummies for business cycles	Fixed affect	size of capitalization increases while exchange rate risk decreases the connectedness between the markets
Sehgal et al. (2018)	ASEAN+6 countries	Forex rate volatility, domestic market index return volatility, international growth opportunities and conditions on the local equity market etc.	Fixed affect and random affect models	Fiscal position, performance of the equity market, governance, bilateral trade and external position are key influencing factors of equity market correlation.
Sehgal et al. (2018)	South Asian countries and ASEAN+6 countries	Macroeconomic, trade and market variables.	Graphically analysed the trends	Poor governance, smaller trade, higher tariffs, and less developed market cause lower level of connectedness in south Asian countries against the ASEAN+6 countries
Aamir and Ali Shah (2018)	Pakistan and emerging Asian economies	Bilateral Trade, industrial growth, GDP Growth, Interest rate, Inflation Difference etc.	Regression model	Most of the influencing factors have significant effect on connectedness between the selected markets
Vithessonthi and Kumarasinghe (2016)	Fifteen countries of Asia.	International trade, financial development, GDP growth, interest rate, exchange rate, and financial openness variables	Regression model	Trade connectedness is not associated with equity market correlation.
Paramati et al., (2015)	Australia and Asian major economies	Bilateral trade intensity and two control variables (exchange rates and inflation differentials).	Panel regression	The bilateral trade intensity has impact on connectedness of equity markets.
Wälti (2011)	Fifteen developed economies	Yearly Economic, financial and cultural variables	Regression analysis	Stronger trade linkages, and financial connectedness lead to higher equity market correlation.
Mobarek (2013)	Twenty Developed and emerging economies from all over the world	Economic, financial and cultural variables	Panel regression for time fixed affect	The higher the difference in economic variables higher the equity market correlation. The financial and business aspect also impacts greatly on the connectedness of the equity market.

Research Hypotheses

Global Financial Crisis

H₁: The global financial crisis (2007–2008) affects the correlation between the equity markets of Pakistan and its trading partners.

Trade Intensity

H₂: Higher trade intensity between Pakistan and its trading partners impacts the correlation between their equity market prices.

Interest Rate

H₃: The absolute differences in interest rates between Pakistan and its trading partners affect the conditional correlation between their equity markets.

Inflation Rate

H₄: The absolute differences in interest rates between Pakistan and its trading partners affect the conditional correlation between their equity markets.

Exchange Rate Differential

H₅: The absolute differences in exchange rates, affects the correlation between the equity markets of Pakistan and its trading partners.

METHODOLOGY

Data Collection

We used daily MSCI stock price indices for the selected trading countries of Pakistan namely: China, Germany, Indonesia, and USA to calculate the quarterly correlation between Pakistan and each of its trading partner country for the study period of 2005 to 2018. Data regarding trade covers quarterly import and export data which has been collected from International Monetary Fund (IMF) Trade Statistics database, called Direction of trade statistics (DOTS). It is quarterly data expressed in US dollars (millions). Furthermore, the data regarding the other macroeconomic variables has been accessed from the Wind database and the other online source¹.

Variable Measurement

Correlation

The correlation has been used as a dependent

¹ The values of change in exchange rate exchange rate have been retrieved from online source available at: <https://www.investing.com/currencies/eur-usd-historical-data>

variable, which has been calculated using DCC-GARCH model. The daily correlation is converted into quarterly correlation in order to be used with other quarterly variables in the main model. For converting daily correlation into quarterly correlation, the average of the daily correlation of the last month of each quarter has been used (Paramati, 2015). The generalized form of the DCC-GARCH model is shown below:

$$H_t = D_t R_t D_t \quad (1)$$

Where H_t denotes conditional variance matrix, D_t represents a $k \times k$ diagonal matrix having conditional variance $\sqrt{h_{it}}$, on its diagonals, and R_t is time-varying correlation matrix comprising of the off-diagonal elements.

Trade Intensity

Studies investigating the variables affecting the integration of equity markets have used the intensity of trade (Bracker et al., 1999; Bracker & Koch, 1999; Mobarek, 2013) as the independent variable. Pretorius (2002) observed that strong bilateral trade relations between two countries make their equity markets more interdependent. The trade intensity between two countries has been measured using the equation (2) given below:

$$TI_{ij} = \frac{X_{ij}}{X_i} + \frac{M_{ij}}{M_i} \quad (2)$$

Where X_{ij} is the exports of country i to country j and M_{ij} shows the imports of country i to country j . X_i and M_i is the total export and total import of country i .

Macroeconomic Variables

Researches have used absolute differences of the macroeconomic variables as the determinant of the correlation between the equity markets. These variables represent a country's economic conditions. The relative changes in the macroeconomic variables of the countries under study affect the correlation between stock prices (Bracker et al., 1999; Dohmen et al., 2011; Pretorius, 2002). These variables include interest rate, inflation rate, exchange rate, and other variables. The larger differences in the state of economies shows smaller equity market relationship (Bracker & Koch, 1999; Mobarek,

2013). Therefore, we calculated the absolute differences of these macroeconomic variables of Pakistan and other countries. The discounted cash flow model relates that various macroeconomic variables affect the cash flows related to the stock prices. Therefore, the correlation between the equity market prices is affected by the relative changes in the macroeconomic variables of the countries under study (Bracker et al., 1999). The larger the gap between the interest rate and the rate of inflation the lower will be the convergence between the equity markets. Similarly, for other macroeconomic variables the larger differences between the variables will show smaller effect on equity market relationship (Bracker et al., 1999; Hwang et al., 2013).

We followed the prior studies conducted by Hooy and Goh (2007) in order to calculate the quarterly inflation from the consumer price index (CPI) data using the transformation in the equation (3):

$$Inflation_t = \frac{(CPI_t - CPI_{t-1})}{CPI_{t-1}} \quad (3)$$

Where CPI is consumer price index, t and t-1 represent the current period, and previous periods respectively. The inflation rate is the rate of change of CPI. Further, we used the absolute values of the inflation rate differentials of two countries (Aamir & Ali Shah, 2018). The absolute difference of the inflation rate of two countries is given in the equation (4):

$$Inf d_{ij} = |inf_i - inf_j| \quad (4)$$

The absolute differences of the lending interest rates of two countries have been used by studies as independent variable. Other studies have also used the logarithmic values of the CPI inflation to calculate the absolute differential of the equity market correlation as the independent variable. We used interest rate differential as the independent variable to determine its effect on the conditional correlation between the two countries (Büttner & Hayo, 2011). We used the absolute difference of the values of the interest rate as the determinant of the connectedness between two countries (Aamir & Ali Shah, 2018; Lin & Cheng, 2008). The Changes in the interest rate would affect the bilateral trade which will impact the returns of equity markets of both the countries. Therefore, the greater disparities between the interest rates of two countries will lower the equity market

correlation of two countries. The interest rate differential of two countries can be expressed as given in equation (5):

$$Ird_{ij} = |intr_i - intr_j| \quad (5)$$

The third macroeconomic variable used in the study is the exchange rate of one currency in terms of another major currency. Paramati et al., (2015) used the logarithmic value of the local currency in terms of Australian dollar. Other studies used each country's exchange rate against the US Dollar. However, due to the availability of quarterly data we used the exchange rate in terms of EURO for the sample period. We used in the value of the currency's quarterly exchange rate and measured the absolute change in the quarterly rate. In the equation the percentage change in the exchange is indicated (6):

$$ERD_t = \frac{(ER_t - ER_{t-1})}{ER_{t-1}} \quad (6)$$

The Global Financial Crisis

A lot of studies have identified the effect of the global financial crisis. We used dummy variable to determine their effect on the correlation between the stock markets because of Global financial crisis. The GFC ranged from the third quarter of 2007 to the fourth quarter of 2008. The dummy D=1 represents the presence of the effect of the GFC in the series (Lin & Cheng, 2008).

Empirical Model Specifications

The empirical analysis of this study has been done in two steps. In the first step the DCC-GARCH model was used to assess the connectedness between the equity markets of the selected countries. Before applying the DCC-GARCH model, the study utilized various econometric techniques which include unit root test, residual diagnostic test and normality test. The study of the influencing factors of the equity market correlation has been done in the second step. In the second step the correlation values were used to determine the significant factors affecting the correlation between the country pairs. In the second step the simple regression, and the panel fixed effects model were used to determine the impact of different variables on the connectedness between them. The final Ordinary Least square (OLS) regression model containing the influencing factors is shown in the following equation:

$$Cor_{ij} = \beta_0 + \beta_1 TI_{ijt} + \beta_2 T_{ijt} + \beta_3 EXR_t + \beta_4 |IR_i - IR_j|_t + \beta_5 |INF_i - INF_j|_t + \beta_6 GFCT + \epsilon_{ijt} \quad (7)$$

Where:

Cor_{ij} = Mean correlation of daily returns in countries i and j during quarter t (daily correlation will be converted using average).

TI_{ijt} = Intensity of country i bilateral trade during quarter t .

T_{ijt} = Intensity of country j bilateral trade during quarter t .

EXR = Exchange rate shift over Quarter t .

IR_i = Country i interest rate during Quarter t .

INF_i = Country i inflation rate during quarter t .

$GFCT$ = Dummy over Quarter t for the global financial crisis.

ϵ_{ijt} = disturbance term, assumed to be iid $N(0, \sigma^2)$.

RESULTS & DISCUSSIONS

Table 2

Descriptive statistics of the Quarterly correlation between Pakistan and the selected countries

	PK-CN	PK-DE	PK-IND	PK-UAE	PK-US
Mean	0.095089	0.049397	0.104494	0.048332	0.097473
Median	0.085400	0.044903	0.092045	0.070169	0.101710
Maximum	0.274665	0.162660	0.304919	0.157875	0.223315
Minimum	-0.063036	-0.064173	-0.016729	-0.187905	-0.088256
Std. Dev.	0.067570	0.043962	0.060468	0.064733	0.051823
Skewness	0.192326	-0.206876	1.307768	-1.739461	-1.296211
Kurtosis	2.990094	3.575341	5.334479	6.340266	6.277021
Jarque-Bera	0.339294	1.150892	28.16648*	53.30481*	40.01140*
Probability	0.843963	0.562454	0.000001	0.000000	0.000000
Sum	5.229869	2.716808	5.747184	2.658284	5.361034
Sum Sq. Dev.	0.246551	0.104365	0.197443	0.226280	0.145025
Observations	55	55	55	55	55

Note: *, denote significance at 1 percent level.

Pakistan and China

Table 3 shows the results of the determining factors of the connectedness between the equity markets of Pakistan and China. Amongst the selected determinants the inflation rate differential between China and Pakistan is significant at 5 per cent level among the coefficients of the influencing factors of equity

The descriptive statistics of quarterly correlation show an overall positive and low level of correlation between the pairs of the equity markets. The mean value of the quarterly correlation between Pakistan and Indonesia (PK-INDO) is the highest among the equity market pairs of the selected countries. The quarterly correlation between Pakistan and China (PK-CN), and Pakistan and USA (PK-US) are around 9 percent. While Pakistan and Germany (PK-DE), as well as Pakistan and UAE (PK-UAE) pairs show the low quarterly correlation among the selected countries. The graph of the quarterly correlation also shows a positive correlation between the equity market pairs for the period of 2005 to 2008, which agrees with the descriptive statistics shown in the table 2. Amongst the selected markets the Indonesian economy has more similarity with the Pakistani economy. Therefore, the highest level of correlation has been observed in the case of Indonesia and Pakistan.

market correlation. The coefficient sign shows that an increase in Pakistan's trade intensity has a positive effect on the connectedness of Pakistan's and China's equity markets while increasing the intensity of Chinese trade with Pakistan has a negative impact on both countries' equity market correlation level. Similarly, the China-Pakistan inflation rate differential negatively affects

connectedness between China and Pakistan equity markets. Thus, Pakistan-China trade and inflation rate differentials are the major influencing factors of Pakistan-China stock market connectedness. Inflation rate differential among the economies

plays key role in the trade of one country to another country. In case of China and Pakistan, the inflation rate differential and trade intensity seem to have a positive impact on the stock market connectedness.

Table 3

Influencing factors of the connectedness of the Pakistan and China equity markets

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.060353	0.052170	1.156857	0.2534
GFC	-0.02195	0.029830	-0.736129	0.4655
TIIJ	0.462568*	0.168866	2.739263	0.0088
TIJI	-0.01767*	0.005154	-3.427992	0.0013
EXR	0.338630	0.296958	1.140329	0.2602
INF	-1.13805**	0.558300	-2.038420	0.0474
IR	-0.00059	0.008826	-0.067730	0.9463

Note: *, and ** denote significance at 1 percent, and 5 percent respectively.

Pakistan and Indonesia

Table 4 shows the results of the influencing factors of the equity market correlation between Pakistan and Indonesia. Trade connectedness between Indonesia and Pakistan is significant at 5 per cent level among the coefficients of influencing factors of equity market correlation. The coefficient sign shows that Pakistan's trade intensity has a negative impact on the connectedness of the equity market between Pakistan and Indonesia.

Contrary to this, Indonesia's trade intensity has a positive impact on the connectedness of the equity market between Pakistan and Indonesia. The other influencing factors have no effect on the equity market correlation of Indonesia and Pakistan. The results show the Indonesian trade affects the stock market connectedness rather than Pakistani trade with the Indonesia. More Indonesian trade would result in the similar movement of the Pakistan and Indonesia stock markets.

Table 4

Influencing factors of the connectedness of the Pakistan and Indonesian equity markets

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.13440*	0.027116	4.956620	0.0000
GFC	0.01514	0.024350	0.621799	0.5371
TIIJ	-6.10475**	2.602074	-2.346110	0.0232
TIJI	25.59321**	12.04268	2.125210	0.0389
EXR	-0.22443	0.280042	-0.801437	0.4269
INF	0.159544	0.532242	0.299758	0.7657
IR	-0.00788	0.004712	-1.673126	0.1009

Note: *, and ** denote significance at 1 percent, and 5 percent respectively.

Pakistan and Germany

Table 5 shows the results of influencing factors of the connectedness of the equity market between Pakistan and Germany. The intensity of Pakistan's trade with Germany has a significant

impact on the connectedness of the equity markets between Pakistan and Germany among the coefficients of influencing factors of equity market correlation. The intensity of the trade of Pakistan with the Germany shows that the trade

of Pakistan with Germany plays a driving role in the connectedness between the stock markets of Germany and Pakistan. moreover, the increase in

the trade of Pakistan with Germany could have increased the connectedness of the stock markets.

Table 5

Influencing factors of the connectedness of the Pakistan and Germany equity markets

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.041435	0.052428	-0.790324	0.4332
GFC	-0.019196	0.026576	-0.722296	0.4736
TIIJ	2.726714**	1.267108	2.151919	0.0365
TIJI	0.003311	0.004747	0.697511	0.4888
EXR	0.153521	0.219325	0.699971	0.4873
INF	0.493588	0.584497	0.844465	0.4026
IR	-0.001717	0.002953	-0.581353	0.5637

Note: ** denotes significance at 5 percent.

Pakistan and USA

The results of the influencing factors of the equity market correlation between Pakistan and USA are shown in table 6. Among the coefficients of the influencing factors of the equity market correlation none of the factors except the dummy variable for the global financial crisis significantly

affects the equity market correlation. GFC of 2007-08 has affected the global economics It can be inferred from the above results that the economic conditions during the GFC has increased the connectedness of the stock markets of both the countries. However other factors are don't affect connectedness of the stock markets of Pakistan and USA.

Table 6

Influencing factors of the connectedness of the Pakistan and USA equity markets

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.114153**	0.051966	2.196669	0.0331
GFC	-0.05377**	0.026572	-2.023755	0.0488
TIIJ	-0.22284	0.217536	-1.024425	0.3110
TIJI	21.25987	22.07940	0.962883	0.3406
EXR	0.257731	0.215851	1.194022	0.2386
INF	-0.27727	0.677509	-0.409251	0.6843
IR	0.000264	0.002709	0.097299	0.9229

Note: ** denotes significance at 5 percent.

Pakistan and UAE

The results of the influencing factors of the equity market correlation between Pakistan and the UAE are illustrated in table 7. The inflation rate differentials of Pakistan and the UAE are significant at 5 per cent level among the coefficients of the influencing factors of equity market correlation.

Inflation is on the major driver of the trade between two countries. As it has been found that trade is a significant factor affection the connectedness of the stock market integration between Pakistan and UAE. If the domestic inflation is higher than the foreign inflation then it tend to import the good from the markets where there is low level of the inflation rate.

Table 7

Influencing factors of the connectedness of the Pakistan and UAE equity markets

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.032301	0.072389	-0.446215	0.6574
GFC	-0.030160	0.042760	-0.705339	0.4840
TIIJ	0.607099	0.660601	0.919010	0.3627
TIJI	3.946802	5.121130	0.770690	0.4447
EXR	0.277208	0.313919	0.883056	0.3816
INF	0.157714	1.029978	0.153124	0.8789
IR	-0.006561**	0.003190	-2.056715	0.0452

Note: ** denotes significance at 5 percent.

The Fixed Effects Model

We used panel regression model to analyse the overall relationship between the equity market correlation and its influencing factors as shown in equation (7). Based on the value of Hausman Test ($p < 0.05$). Latief and Lefen (2018) found that the fixed affects model is an appropriate model for the panel of the variables of the countries. The

results of the fixed effects model presented in table.8 show that the trade intensity from both of the countries of the pair significantly affects the equity market correlation. the other factor which significantly affects the equity market correlation is the GFC. Therefore, the findings of the analysis with fixed effects model support the results of the OLS model.

Table 8

Influencing factors of equity market correlation Aggregate (Panel) Level Estimation

Cor1	Coefficient	Std. Error	t	Probability
C	0.079139*	0.014159	5.59	0.000
TIIJ	0.180462***	0.10002	1.8	0.072
TIJI	-0.00741**	0.003156	-2.35	0.020
EXR	0.140442	0.123748	1.13	0.257
INF	-0.23022	0.276281	-0.83	0.405
IR	-0.00185	0.001367	-1.35	0.177
GFC	-0.02335***	0.012751	-1.83	0.068
R-squire		0.2952		
Observations		268		
Hausman Test (Prob.)		0.0110		

Note: *, **, *** denote significance at 1 percent, 5 percent and 10 percent respectively.

CONCLUSIONS

Most of the equity market correlation studies relied on the question of how equity markets are integrated. These studies do not concentrate on the underlying factors behind equity market correlation. This study fills the literature gap by studying the correlation of Pakistani equity market with the equity markets of other foreign countries,

especially countries having trade connection with Pakistan. We selected China, Germany, Indonesia, UAE, and USA, as these countries are trading countries of Pakistan. Using the DCC-GARCH model, we used daily Morgan Stanley International Capital (MSCI) indices to assess the pairwise correlation of the equity market pairs of Pakistan with the foreign countries. To match the correlation values with frequency

of the macroeconomic variables we converted daily correlation to quarterly correlation. We determined the effect of trade intensity, differentials of macroeconomic indicators, and the GFC on the correlation between the equity market pairs. We used simple OLS regression, and the panel regression models to determine the effect of each variable on the connectedness of the country pairs.

We found different results for the five country pairs. All the influencing factors have different effects of the given level of connectedness between the country pairs. The most prominent determinant affecting the pairwise correlation was the trade intensity between two countries which was found significant in most of the pairs. The trade intensity between two countries positively affects the correlation between the equity market pairs in some instances while the in some cases it seems to have no effect on the correlation between the pairs of the equity markets. The other factors significantly affecting the equity market correlation are the interest, and inflation rate differentials of between the country pairs. The GFC also seems to increase the correlation between the equity market returns of the Pakistan and USA.

The theory of equity market interdependence clarifies that the equity market interrelationship depends on the interrelationship of the macroeconomic variables and the trade intensity between two countries. The convergence (divergence) of the influencing factors should converge (diverge) the correlations between the equity markets. As the correlation is dependent on the influencing factors, therefore, it is possible for the investors to determine the level of connectedness between these markets and make the diversification decisions. However, the other ways of determining the relationships between the equity markets could also be beneficial. This study has practical implication for the investors and the policy makers of Pakistan and its trading countries.

Competing Interest

The authors had no competing interests.

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